French ethnologist, for carrying on some explorations in the vicinity of Tiahuanuco, in Bolivia, a region which abounds in objects of archæological interest. Mr. Meiggs has arranged that a full series of these objects shall be presented to the U.S. National Museum.

A VALUABLE entomological collection has been presented to the Oxford University Museum by Mrs. Tylden, the relict of the late Rev. W. Tylden, formerly of Balliol College. The collection numbers 23,518 specimens, arranged in cabinets.

PROF. PALMIERI, Director of the Observatory on Mount Vesuvius, has been made an Italian Senator.

A DESPATCH received at Rome from Aden, November 19, states that the Italian African Expedition has arrived in Shoa.

THE Government Resident at Somerset has telegraphed to the Colonial Secretary that Messrs. D'Albertis, Hargrave, and party have returned safely from their expedition to the Fly River. They ascended the country a distance of 350 miles above the spot reached by the expedition party of last year. They were unable to communicate in any way with the natives who were very numerous and hostile.

A SIXTH edition of Prof. Page's well-known "Advanced Text-Book of Geology" has been published. The work has been enlarged "to embrace whatever is new and important in the science, to afford space for additional illustration, and to combine, as far as possible, the principles with the deductions of geology."

WE have on our table the following books :—Preliminary "Report on the Forests of Pegu," by Sulpice Kurz (Calcutta). "The Aquarium," J. E. Taylor (Hardwicke and Bogue). "Spiritualism and Animal Magnetism," Dr. Zerffi (Hardwicke and Bogue). "The Theory of Colour," Dr. W. von Bezold (Trübner). "The Art of Retouching," Burrows and Colton (Marion). "Science in Sport made Philosophy in Earnest," by Robert Routledge (George Routledge and Sons). The ninth edition of "Kirke's Physiology," edited by Morrant Baker (John Murray). "Between the Danube and the Black Sea," H. C. Barkley, C.E. (John Murray). The fourth edition of Wanklyn's "Water Analysis" (Trübner). "Demonstrations of Microscopic Analysis," Harley and Brown (Longmans). "Mushrooms and Toadstools," Worthington G. Smith (Hardwicke and Bogue). "Geological Observations," Charles Darwin, F.R.S. (Smith, Elder, and Co.). "Lessons in Electricity," John Tyndall, F.R.S. (Longmans). "Our Birds of Prey," The Raptores of Canada, H. G. Vennor (Sampson Low and Co.).

THE additions to the Zoological Society's Gardens during the past week include two Prussian Carp (*Carassius vulgaris*), European, presented by Lord Arthur Russell, F.Z.S. ; a Bubaline Antelope (*Alcelaphus bubalinus*), an Addax Antelope (*Addax naso-maculatus*) from North Africa, a Buff-breasted Partridge (*Ptilopachys ventralis*) from West Africa, four Brazilian Cormorants (*Phalacrocorax brasiliensis*) from Brazil, purchased ; a Macaque Monkey (*Macacus cynomolgus*) from India, a Chilian Sea Eagle (*Geranoëtus aguia*) from South America, deposited ; a Hairy-rumped Agouti (*Dasyprocta prymnolopha*), born in the Gardens.

SCIENTIFIC SERIALS

Schriften der physikalisch-oekonomischen Gesellschaft zu Königsberg (1875, 1 and 2).—These parts, amongst a number of smaller papers and notes, contain the following more important treatises: —On the determinations of temperature in the soil at different depths at the station at Königsberg, by Prof. E. Dorn.—Observations on the genera of *Nematidæ*, by C. G. A. Brischke and Prof. Dr. G. Zaddach. This paper occupies more than half of Part 1.—On the temperature in the interior of animal bodies, by Dr. Adamkiewicz.—On a new species of Algæ, *Merismopedium Reitenbachii*, Casp., by Prof. Caspary.—On the different forms of the stigmatic disc of *Nuphar luteum*, Sm., by the same.—On the latest investigations made by M. Lassaulx on earthquakes, by O. Tischler.—On the so-called "Moosbrüche," specially on the "Zehlaubruch," near Tapiau, by Herr Stiemer.—On the courses of rivers," &c., in the North German plains during the Diluvial period, by Prof. Berendt.—On one of Euler's geometrical problems, by Dr. Saalschütz.—On the courses of rivers in the province of Prussia, by Herr Stiemer.—On the Colorado beetle, by Dr. Schiefferdecker.—On reflectors, by Dr. Berthold. —On Gore's rotating ball, by Herr Momber.—On the artificial production of colours from the white of eggs, by Dr. Adamkiewicz.—On Phylloxera, by Dr. Benecke.—On the oscillations of *terra firma*, by Dr. A. Jentzsch.—New list of Prussian beetles (fourth paper), by Dr. Lentz. The author makes the total of different species to the number of 3,216!—On old Prussian "Kjökken Möddings" at the coast of the "Frische Haff," by Prof. Berendt.—On the conception of value in the different theories of the same, by Adolf Samter.—On the power of accommodation amongst plants and insects, by Dr. G. Czwalina.—On an erratic block-limestone found near Tilsit, by Dr. Friederici.—On salicylic acid, by Prof. Samuel.—Archæological researches on the "Kurische Nehrung," by O. Tischler.—On an alleged proof of the early existence of man in Europe, by Dr. Jentzsch.—On an unusually large fungus, *Agaricus suffructicosus*, by Prof. Caspary.—The Appendix contains the report sent by the Society to the Provincial Landtag on its geognostical researches in the province of Prussia.—The parts further contain a memoir of the late Prof. Argelander, of Bonn, by Dr. Luther.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, November 9.—Prof. H. J. S. Smith, F.R.S., president, in the chair.—Mr. J. W. L. Glaisher communicated a note on certain identical differential relations.—Mr. Tucker read parts of papers by Mr. Spottiswoode on curves having four-point contact with a triply-infinite pencil of curves, and by Mr. E. B. Elliott on some classes of multiple definite integrals.—In a paper published in the *Mathematische Annalen* (vol. iii. p. 459) Brill has investigated the case of curves having three-point contact with a doubly infinite pencil of curves ; and in the same journal (vol. x. p. 221) H. Krey, of Kiel, has applied a method, similar to that of Brill, to the next step in the problem proposed in Mr. Spottiswoode's paper. He does not, however, appear to have succeeded in completely eliminating the differentials which occur in the process ; and in that respect his solution is incomplete. Some formulæ used in Mr. Spottiswoode's paper on the contact of curves and surfaces, and in particular in that on the sextatic points of a plain curve (*Phil. Trans.*, 1865, p. 657), prove to be directly applicable to the question. An application of them to Brill's problem will be found in a paper in the *Comptes Rendus* (1876).

Astronomical Society, November 10.—Mr. Huggins, president, in the chair.—The Astronomer-Royal gave a short account of the proceedings of the Royal Observatory during the recess, describing the lunar and physical observations which had been assiduously prosecuted and the state of the calculations for his new lunar theory.—A paper by Prof. Langley, of the Allegany Observatory, Pennsylvania, on the measurements of the direct effects of sun-spots on terrestrial climates was read. Prof. Langley has made experiments to determine the difference in the amount of heat radiated from the centre of a sun-spot and from an equal area of penumbra and photosphere. Combining these results with the amount of the sun-spot area given as existing during a period of maximum of sun-spot frequency in the tables of Messrs. De la Rue, Stewart, and Lœwy, he calculated that the mean terrestrial temperature due to solar radiation at a period of sun-spot minimum would be something between three-tenths and one-twentieth of 1° C. greater than at a period of sun-spot maximum. The Astronomer-Royal pointed out that the observations of underground temperature made at the observatories at Paris, Edinburgh, and Greenwich showed differences in the mean annual temperature of the surface soil which amounted to as much as 6° F. An examination of the temperatures at different depths showed that the differences of surface temperature had their cause in something external to the earth, but he had not found that the differences of mean surface temperature coincided with the variations in the amount of the English serial crop as given by the Board of Trade returns or with the periods of sun-spots maxima. Mr. De la Rue said that it did not follow that the

amount of solar radiation would necessarily vary inversely as the sun-spot area, for at a period of maximum sun-spot area it was possible that the radiation from the photosphere might be increased to such an extent as wholly to counteract the difference caused by the decrease in the apparent area of the photosphere. He further remarked that the numbers given in his papers in conjunction with Messrs. Balfour Stewart and Lœwy must not now be relied upon, as some serious errors had been discovered which he was now endeavouring to put straight by a re-investigation of the whole subject.—Mr. Penrose read a paper entitled "An Endeavour to simplify the Method of making the Correction for the Spheroidal Figure of the Earth in Lunar Observations, and particularly with Reference to its Effect upon the Lunar Distance."—Mr. Christie described some observations which he had made with a polarising photometer upon the relative brightness of different parts of the disc of Venus. He had found that when the disc of Venus was gibbous, the last part of the disc to disappear, as its brightness was decreased by rotating his photometer, was a sausage-shaped patch, the convex edge of which was found to be distinctly within the limb of the planet. He thought that his observations supported Mr. Brett's theory as to specula reflection from the surface of Venus.

Linnean Society, November 2.—Prof. Allman, president, in the chair.—In exhibiting a live specimen of the Norwegian Lemming, the survivor of seven at starting, Mr. Duppa Crotch called attention to charts he had made showing the nature of the ground traversed in two instances in which he himself had witnessed the westerly migration of this singular little rodent.—Mr. G. Bentham, vice-president, read a paper on the distribution of the Monocotyledonous order into primary groups, more especially in reference to the Australian flora, with notes on some points of terminology.—Dr. Francis Day drew attention to examinations he had made on some Irish sticklebacks (*Gasterostei*). These had led him to doubt the conclusions arrived by M. Sauvage (*Nouv. Archiv. d. Mus.*, 1874), as to the propriety of dividing the family into subgenera and some seventeen species. Dr. Day has noticed such abnormal variations in the presence and absence of ventral fin and spines in specimens of the three-spined and ten-spined sticklebacks as cause him to believe these appendages to be a very imperfect diagnostic and specific character. Nay more, as certain other Acanthopterygians have been generically divided by such features, it is questionable whether further observations may lead to considerable necessary revision of the families. He is of opinion, moreover, that the spinal armature of at least the *Gasterostei* has an increment in the ratio of their proximity and access to a maritime habitat.—Mr. H. W. Bates communicated a paper by Mr. D. Sharp on the respiratory function of the Carnivorous Water Beetles (*Dytiscidæ*). Experiments made by the author on numerous species show that there are wide differences in the length of time they spend submerged and on the surface for breathing exposure. For example, the *Pelobius Hermanni* remains under water in a ratio of 375 to 1 of air exposure; whereas *Dytiscus marginalis*, a more highly developed form, has a corresponding ratio of about 12 to 1. Most specimens of the group are more active by night than by day. The *P. Hermanni* and *Hydrovatus clypealis* he regards as much less developed, and adapted for moving through the water than our indigenous water-beetles; and therefore, along with the American Amphizoa, appear to him to represent the most rudimentary and primitive of existing forms of the Dytiscidæ.—Prof. Dickie gave a supplemental notice of Marine Algæ obtained in the *Challenger* Expedition. Of some fifty species one only is new.—A description of *Thaumantis pseudaliris* and *Amesia pexifascia*, two new Lepidopterous forms from Malacca, by Mr. A. Butler, was taken as read.—The same author also had a communication on the genus *Euptychia*, a revision, with the addition of twelve new species being made; a case of these butterflies was exhibited in illustration of his paper.—A second communication, by Mr. D. Sharp, referred to new species of beetles (*Scarabæidæ*) from Central America; these had been captured by Mr. Belt, chiefly in the neighbourhood of Chontales.—Mr. A. Peckover exhibited and made a few remarks on two skins of the young of the Madagascar insectivore, *Hemicentetes nigriceps*, Günth., and on a series of insects from the same island, collected by Mr. A. Kingdon, near Antananarivo.—Mr. E. D. Crespigny showed a specimen of the Umbelliferous plant, *Tordylium maximum*, L., obtained near Tilbury Fort, a locality where it had disappeared for a considerable length of time.

Chemical Society, November 16.—Prof. Abel, F.R.S., president, in the chair.—A paper on barwood, by the late Prof. Anderson, was read by the Secretary, describing the method of preparing *baphuin* from it, and also some of the educts obtained by the action of various reagents.—The second communication was on the alkaloids of the aconites, Part I. on the crystallisable alkaloids contained in *Aconitum napellus*, by Dr. C. R. A. Wright. The author finds that the alkaloids from *A. ferox*, which he calls *pseudanicotine*, $C_{36}H_{49}NO_{11}$, differs both in properties and in composition from *aconitine*, $C_{33}H_{43}NO_{12}$, the crystalline alkaloid of *A. napella*. In one instance, however, he obtained from the root of the latter a perfectly distinct bitter crystalline alkaloid, *picroconinute*, possessing scarcely any toxic power; whether this is an alteration product of aconitine or not remains at present undetermined.—Mr. G. S. Johnson then read a paper on potassium triiodide, a crystalline compound obtained on saturating a saturated solution of potassic iodide with iodine, and slowly evaporating the solution over sulphuric acid. It forms prismatic or tabular crystals having an appearance very similar to that of iodine.—The last communication was by Mr. T. S. D. Humpidge, on the coal-gas of the metropolis. He has carefully analysed and determined the illuminating power of different samples, and comes to the conclusion that the gas at present supplied is but little if any better than it was twenty-five years ago, the actual increase in illuminating power being due to the use of improved burners.

Physical Society, Nov. 4.—Prof. G. C. Foster, president, in the chair.—The following candidates were elected members of the society:—Warren de La Rue, D.C.L., F.R.S., and W. H. Preece.—Dr. Guthrie read two letters which he had received from Dr. Forel, in continuation of a communication which he made to the Society on May 27 last, in reference to the "Seiches" or periodic oscillations which take place in the Swiss lakes, and on which he has recently made an elaborate series of observations. Since his communication he has found in a pamphlet by Dr. J. R. Mérian, published in 1828, a formula which is strictly applicable to the phenomena under consideration. If t be the duration of half an oscillation, h the depth of the lake, and l its length, $t = \sqrt{\frac{\pi l}{g}} \left\{ \frac{e^{\frac{\pi h}{l}} + e^{-\frac{\pi h}{l}}}{e^{\frac{\pi h}{l}} - e^{-\frac{\pi h}{l}}} \right\}^{\frac{1}{2}}$. Considering that probably this formula will be applicable to lakes of irregular depth if h be the mean depth, he has applied it to several lakes, and the following are some of his results. In the case of transverse seiches on Lake Leman, the formula gives 216 metres as a mean depth, and 334 metres is the greatest known depth. With a longitudinal oscillation, the mean depth is found to be 130 metres. In the case of Lake Wallenstadt, the formula having shown the mean depth to be somewhat greater than the generally accepted greatest depth, Prof. Forel took a number of fresh soundings, and found a great basin of comparatively even bottom and of such a depth as to render probable the mean depth given by the formula.—Mr. O. J. Lodge suggested that the formula would be rendered more simple by using the hyperbolic function. It would then become $t = \pi \sqrt{\frac{l}{g}} \operatorname{Coth}^{\frac{1}{2}} \frac{\pi h}{l}$. Mr. Lodge also indicated the curve which this equation represents.—Dr. Stone exhibited some diffraction gratings on glass and metal, ruled for him by Mr. W. Clark, of Windsor Terrace, Lower Norwood. The majority of them were close spirals about 1,000 to the inch, which, when held between the eye and a distant lime-light, exhibited circular spectra of great brilliancy. The slight difference between the spiral and true circles appeared to exercise no appreciable effect on the result. The metal gratings were of linear form, 1,000 lines to the inch, intended for use by reflection in a spectroscope. The spectra thus obtained were of much greater brilliancy than those ordinarily obtained by refraction, and presented obvious advantages for examining the ultra-violet rays. He explained the mechanical difficulties which had been surmounted in their manufacture together with the manner in which the diamond cutters are prepared. The metals hitherto employed, namely, cast-steel and German silver, are objectionable, and Dr. Stone proposes, on the suggestion of Prof. McLeod, to employ speculum metal, and will report the result of the experiments more fully at a subsequent meeting.—Dr. Guthrie then briefly described some experiments which he has made to determine the effect of a crystalloid on a colloid when in the presence of water. Mr. Graham, in his classical researches, made numerous experiments with a salt on one side of

a colloid membrane and water on the other, and Dr. Guthrie thought it might be well to determine what action, if any, takes place when a salt is added to a solution of a colloid such as size. Two or three lumps of rock salt were added to a jelly of size, and the whole hermetically sealed in a glass tube. The colloid parted with its water readily, a saturated solution of the salt was obtained, and the size became perfectly white and opaque, having undergone a structural change. Experiments were also made employing a more hygrometric salt, such as chloride of calcium.—Mr. W. C. Roberts pointed out that a jelly containing 5 per cent. of silicic acid readily parts with water to sulphuric acid, and dries into a hard glass like hydrate of silica. He asked whether this might be considered as analogous to the action of salt on size, or whether the strong affinity between the acid and water removed it to another class of action. Dr. Guthrie thought it might be possible to establish the existence of a point at which the jelly did not give up its water to the hygrometric substance. He also pointed out the analogy between a jelly and a mass of small bags filled with liquid.

Entomological Society, November 1.—Prof. Westwood, president, in the chair.—Mr. F. Smith exhibited some remarkable specimens of thorns from Natal and Brazil, which had been taken possession of by certain species of *Cryptoceridæ* for the construction of their nests. Some of the thorns were as much as 3 inches in length.—Prof. Westwood mentioned an instance of the hairs of a larva of *Lasiocampa rubi* having caused considerable irritation of the skin, and that the irritation was complained of by his correspondent for a week afterwards.—The Professor exhibited a singular Coleopterous larva from Zanzibar, of a flattened, ovate form and a steel-blue colour, with two points at the extremity of the body, and with long, clavate antennæ. The head bore some resemblance to that of the dipterous genus *Diopsis*. He also exhibited a specimen of the butterfly, *Hesperia sylvanus*, received from the Rev. Mr. Higgins, of Liverpool, having the pollinaria, apparently of an Orchid, attached to the base of the tongue. Also an Orchid bulb purchased by Mr. Hewitson with a collection of roots from Ecuador, which was found to contain nine living specimens of cockroaches, comprising six different species, viz., *Blatta orientalis*, *Americana*, *cinerea*, *Maderæ*, and two others unknown to him, some being of considerable size.—Mr. Dunning read a "Note on *Acentropus*," in which he remarked on Heer Ritsema's Second Supplement to his Historical Review of the genus, published in the *Transactions* of the Entomological Society of the Netherlands, in which that author tried to prove that two distinct species existed, of which one (*A. niveus*, Oliv. = *A. Garnonsii*, Curt.) has a female with rudimentary wings, and the other (*A. latipennis*, Möschl. = *Zancle Hansoni*, Ste.), has a female with normally developed wings; whereas, Mr. Dunning argued that the facts, as stated by Heer Ritsema, did not in any way prove the duality, but were quite consistent with the unity of the species.

Institution of Civil Engineers, November 14.—Mr. George Robert Stephenson, president, in the chair.—The paper read was on the Japan lights, by Mr. R. H. Brunton.

PARIS

Academy of Sciences, November 13.—Vice-Admiral Paris in the chair.—The following papers were read:—Theorems relative to systems of three segments making a constant length, by M. Chasles.—Note on the recent progress of phylloxera in the departments of the two Charentes, by M. Bouilland.—Continuation of observations of eclipses of Jupiter's satellites at the Observatory of Toulouse, by M. Tisserand. For eclipses of the first satellite little seemed to be gained by using larger instruments; for those of the second and third the difference was greater.—M. Milne-Edwards presented the first part of tome xii. of his work on comparative physiology and anatomy of men and animals. It treats of audition and sight.—Report on a memoir of M. Fouqué, "Mineralogical and geological researches on the lavas and dykes of Thera" (island of Santorin group). These lavas contain two, and often three triclinic felspars (some say volcanic rocks never contain more than one); albite predominates among the small crystals; labradorite or anorthite among the large. These anorthite lavas (hitherto thought exceptional) form forty-one of the dykes of Thera. M. Fouqué shows, from experiments, that a lava fused and suddenly cooled is quite as crystalline as when it has solidified slowly; crystals are formed before ejection from the ground. Contrary to M. Tschermak, who would eliminate from the catalogue of mineralogical species all triclinic felspars except albite and anorthite, M. Fouqué shows reason for retaining oligoclase and labradorite. Tridymite, a variety of crystallised silicon, is found in the lavas in form of thin hexagonal imbricated plates; M. Fouqué regards it as a posterior formation to the other elements, and as having arisen at a high temperature under the influence of imprisoned droplets of water, when the surrounding rock was liquid or viscous. The report speaks highly of the value of this memoir.—Researches on the brachistochrome of a heavy body, with regard to passive resistances, by M. Haton de la Goupillière.—On the characteristics of systems of conics and surfaces of the second order, by M. Halphen.—M. François recommended, against phylloxera, the vitriolic water from the mines of pyrites of Sainbel.—Observations relative to the general theory of trombes, by M. Virlet d'Aoust. He describes some dust whirlwinds observed on the Mexican plateaux.—Determination, by the method of analytic correspondence, of the envelope-surface of a surface whose equation contains n parametres connected together only by $n-2$ relations, by M. Saltel.—Influence of temperature on magnetisation, by M. Gaugain. The value of the temporary variation varies considerably from one bar to another. To determine the influence of temperature this should be kept invariable throughout an experiment; the author describes how he accomplished this. With a bar susceptible of considerable temporary variation, the magnetism developed at 300° is weaker than at ordinary temperature, but in the opposite case it is stronger.—On the hydrates of sulphate of copper, by M. Magnier de la Source.—On margaric chloride and its derivatives, by M. Villiers.—Researches on quercite, by M. Prunier. He considers quercite to form a transition between the fatty series and the aromatic series.—On angelic acid, by M. Demarçay. He verifies his former experimental results against some contradiction of them by M. Fittig in the Berlin Chemical Society.—Physiological experiments on the functions of the nervous system of Echinida, by M. Fredericq. The cords described as the nervous system are the means by which harmony of movements is established. Facts seem also to favour the existence of a nervous plexus situated in the thickness of the external tegument.—On the mobile state of *Podophrya fixa*, by M. Maupas. This, he says, hardly merits its name; it is more mobile and vagabond than known Acinetinians, and is an intermediate type between suctorial infusoria and ciliated infusoria, properly so called. He describes in detail the changes which take place in it during its mobile period.—On the existence of asparagine in sweet almonds, by M. Portes.—On the influence of leaves and floral branches on the nature and quantity of sugar contained in the scape of agave, by M. Balland. Both leaves and flowers have an incontestable rôle in the formation of sugar.—On a meteoric iron very rich in nickel, found in the province of Santa Catharina (Brazil), by MM. Guignet and Ozorio de Almeida; iron 64 per cent., nickel 36. It appears to belong to the terrestrial rocks. M. Daubrée remarked that a careful examination of all that region was very desirable.—Chemical composition of the water of the Bay of Rio de Janeiro, by MM. Guignet and Teller. It contains considerable quantities of silica and alumina (9·5 and 7·5 gr. respectively, per cubic metre). This is from decomposition of the gneiss and granite rocks under friction of the water.

CONTENTS

Erratum.—P. 57, col. i. line 12 from bottom, for "Tides" read "Fish."